

DISTRIBUTION AND STATUS OF THE ASIATIC BLACK BEAR *URSUS THIBETANUS* IN INDIA¹

S. SATHYAKUMAR² AND A. CHOUDHURY³

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²Wildlife Institute of India, P.O. Box 18, Chandrabani, Dehradun 248 001, Uttarakhand, India. Email: ssk@wii.gov.in

³The Rhino Foundation, c/o Assam Co. Ltd., Bamunimaidam, Guwahati 781 021, Assam, India. Email: badru1@sancharnet.in

In 1994-1995, the first author evaluated the status and distribution of the Asiatic Black Bear in India and reported presence of the species in 53 protected areas and 62 other localities. After 10 years, we assessed the status and distribution of the Asiatic Black Bear through a questionnaire survey (n=90), results of recent field surveys, and expert knowledge. The results of our 2005 survey (83% returned responses) indicate that the Asiatic Black Bear is found in 82 protected areas and 98 other localities. Using rule-based modelling in a GIS, we estimated the potential Asiatic Black Bear habitat range in India to be c. 270,000 sq. km and used densities of 1 bear /40 sq. km and 1 bear /50 sq. km to extrapolate an estimated Asiatic Black Bear population of 5,400 to 6,750. After the 2005 survey, substantial information has been added to the existing knowledge on the distribution and status of the Asiatic Black Bear in India. This includes confirmation of its presence in 21 protected areas and 45 other localities for the first time. Poaching for illegal trade in bear parts, retaliatory killings to reduce bear-human conflicts and habitat loss are the major threats to the species in India. Asiatic Black Bear populations in India seem to be declining in many areas, although no quantitative information on the population trend is available due to the lack of a regular monitoring exercise. We recommend that control of poaching for the illegal trade in bear parts and retaliatory killings, and prevention of habitat degradation or loss, and monitoring of bear populations be accorded top priority.

Key words: distribution, status, protected area, threats, conservation, management

INTRODUCTION

The Asiatic Black Bear has been reported to be continuously distributed from southern and eastern Asia westward through Pakistan and Afghanistan to Baluchistan Province of Iran, and eastward to Indo-China through much of China, Korea and Japan with an isolated population in Taiwan (Cowan 1970; Servheen 1990; Mallon 1991; Sathyakumar 2001). Schaller (1977) reported a wide distribution for the Asiatic Black Bear from Russia and Korea to Indo-China and from the forests of the Himalaya below 3,750 m west, as far as Afghanistan and Iran. The Himalayan region and the hills of north-east India cover c. 591,800 sq. km (18% of India) and probably hold one of the largest populations of the Asiatic Black Bear in Asia. Johnsingh (2003) has presented an excellent review on the status of all four species of bear in India along with recommendations for their conservation and management. He reported that the Asiatic Black Bear is present in at least 56 protected areas and estimated its habitat range in India to be about 300,000 sq. km and its population to be a minimum of 3,000 animals.

In this paper, we review the distribution and relative abundance of the Asiatic Black Bear in India based on a review of the existing literature, results of recent field surveys, a questionnaire survey, expert knowledge, and a few interviews with scientists, researchers, forest and wildlife managers, and field staff of the Forest Departments in northern and north-

eastern India. We compare the results of this survey with the results of a similar survey carried out in 1994-1995 (Sathyakumar 2001) and make an assessment of the changes in the information on the distribution of the Asiatic Black Bear in India during the period from 1995 to 2005. We also make a realistic estimate of the potential Asiatic Black Bear distribution range and its population in India.

MATERIAL AND METHODS

In 2005, a questionnaire was developed that requested the following details: bear sightings or signs (faeces, feeding/resting signs, tracks) in PAs such as national parks, wildlife sanctuaries, conservation reserves and adjacent areas (forest divisions, reserved forests); relative abundance of bears (very rare, rare, fairly common, common or abundant) based on the frequency of encounters and their signs in the area; information on the past and present relative abundance; the extent and magnitude of threats to the Asiatic Black Bear and its habitats; bear-human conflicts; conservation and management, and the season(s) or month(s) and duration of time spent by the respondent in the Asiatic Black Bear habitat. The questionnaire was sent to protected area (PA) managers (n=90) who were then working, or who had worked for at least 2 years in the Asiatic Black Bear range states of India, namely Jammu and Kashmir, Himachal Pradesh, Uttarakhand, West Bengal, Sikkim, Arunachal Pradesh, Meghalaya,

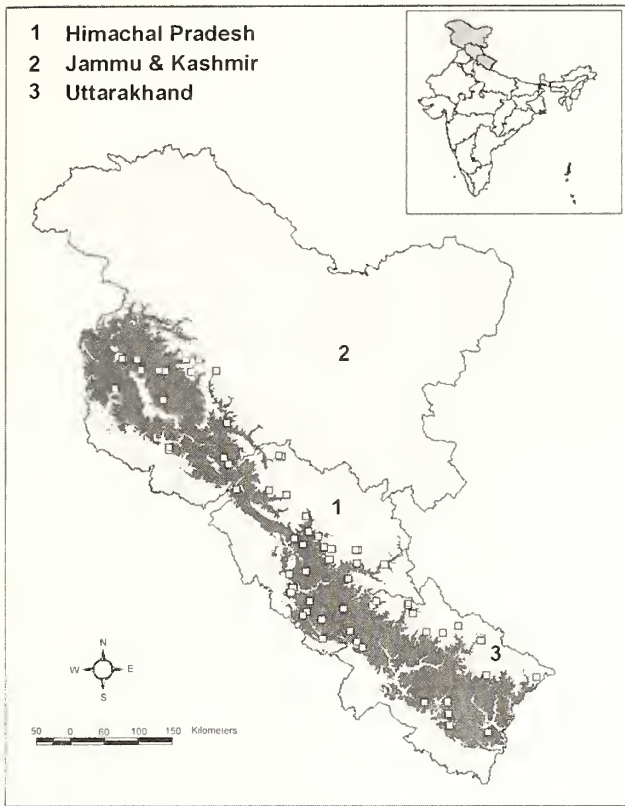


Fig. 1: Asiatic Black Bear distribution in northern India (states of Jammu and Kashmir, Himachal Pradesh and Uttarakhand); Squares denote protected areas

Manipur, Mizoram, Nagaland and Tripura; 83% of the questionnaire were returned. Informal interviews were held with a few scientists and PA managers to validate and enhance the available information. The information on the relative abundance of the species in PAs was updated whenever additional knowledge became available. The second author has carried out extensive wildlife surveys in north-east India since the early 1980s, and the information on the status and distribution of Asiatic Black Bear was refined for north-east India based on results of such recent surveys. An approximate distribution range map for the Asiatic Black Bear in India was prepared based on rule-based modelling (altitude range limits and forest cover) using a GIS and refined from expert knowledge and questionnaire responses. The rule-based model works on the basis of Boolean logic, which relies on well established available knowledge and determines the area to be either suitable (1) or unsuitable (0). The altitude range (1,200 to 3,300 m in the Western Himalaya, 70 to 4,300 m in north-east India) that is potentially used by the Asiatic Black Bear during summer was used in the model. Availability of forest cover was the other parameter that was used in the model. Asiatic Black Bear are also known to use relatively productive habitats that are man-made, such as croplands and

orchards that are interspersed with or that lie adjacent to forested habitats (Sathyakumar 2001; Johnsingh 2003). Arc/Info was used to develop the distribution map.

RESULTS

Asiatic Black Bear: Distribution and Relative Abundance

In India, the Asiatic Black Bear inhabits forested habitats ranging in altitude from 1,200 m to 3,300 m (Prater 1980), and also in areas below 1,200 m in the Siwaliks. Its range overlaps with that of the Sloth Bear (*Melursus ursinus*) below 1,200 m and that of the Himalayan Brown Bear (*Ursus arctos isabellinus*) above 3,000 m. In north-east India, the range overlaps with both the Sloth Bear and the Sun Bear (*Ursus malayansis*) (Choudhury 1997a, b). The Asiatic Black Bear is distributed throughout the Himalayan ranges (Fig. 1) in the north-west (Jammu and Kashmir; Himachal Pradesh), west (Himachal Pradesh and Uttarakhand), middle (Sikkim and northern West Bengal) and east (Arunachal Pradesh). The species is also present in the hills at the edge of the plains of other north-eastern states of India (Fig. 2). The Asiatic Black Bear distribution in the Indian subcontinent is contiguous with those in Nepal (eastward from Uttarakhand to Sikkim) and Bhutan (eastward from Sikkim to Arunachal Pradesh). At present, the Asiatic Black Bear is continuously distributed in North India, all along the Himalaya (1,200 to 3,300 m) and the Eastern Himalayan ranges, and the hills of north-east India (70 to 4,300 m). The results of the 2005 survey indicated that the Asiatic Black Bear occurs in 82 PAs (Table 1) and over

Table 1: Asiatic Black Bear distribution in protected areas (PAs), forest divisions (FDs) and reserved forests (RFs) in India, 2005

State	PAs	FDs & RFs	Elevation (m)	Status
Jammu and Kashmir	16	>20	1,000-3,300	Fairly common
Himachal Pradesh	21	>25	1,000-3,300	Fairly common
Uttarakhand	10	>15	1,000-3,300	Fairly common
West Bengal (northern)	4	>1	200-3,000	Rare
Sikkim	3	>2	300 up	Rare
Arunachal Pradesh	9	>10	100 up	Common
Assam	7	>15	70-1,900	Rare
Meghalaya	3	>4	80-1,500	Very rare
Mizoram	6	>2	100-2,100	Very rare
Tripura	1	>1	200-1,000	Occasional
Manipur	1	>2	150-2,900	Rare
Nagaland	1	>1	120 – 3,800	Fairly common
Total	82	>98		

98 forest divisions (FDs), reserved forests (RFs), and forested valleys (FVs). PAs include national parks (NP), wildlife sanctuaries (WS), conservation reserves (CR) and community reserves (CMR).

Jammu and Kashmir: The Asiatic Black Bear is reported from 16 PAs and 20 FDs, RFs, and FVs. Survey respondents reported the status of the Asiatic Black Bear as 'fairly common'. The best known populations of the Asiatic Black Bear in India are in this state (Table 2a). The bear is also reported from over 20 other areas and some of these include FDs in Lidder (Pahalgam), Naranaga, Sindh, Wangat and Anantnag, and the RFs (RF) of Gugnar, Biano, Pir Panjal, Zaberwan, Bandipora and Kahai (M.S. Bacha, Department of Wildlife Protection, Jammu and Kashmir, pers. comm. in 2005). The Asiatic Black Bear is reported from Banihal CR, Sumchan Saphare WS and proposed PAs, such as Pir Panjal NP, Ghambiar Mongtu WS, Dhera-ki-Gali WS, Ans River WS, and Nowshera WS. In Jammu region, it is reported from the FDs of Marwa, Rambandh, Batote, Doda, Badhruwa, Kistwar, Poonch, Rajouri, Nowshera, Reasa, Mahor, Udampur, Jammu, Ramnagar and Bilwar (N.A. Kitchloo, Department of Wildlife Protection, Jammu and Kashmir (pers. comm. in 2005).

The responses of the 2005 survey have added substantial information on the distribution of Asiatic Black Bear in this state. The presence of the Asiatic Black Bear has been reported from PAs that have no reported presence of Asiatic Black Bear in the past and from five newly created CRs. Survey respondents reported that Asiatic Black Bear feeding signs and scats were commonly encountered in these areas and that these were of bear-human conflicts. Saberwal (1989) reported Asiatic Black Bear density of 1.3-1.8 bears/sq. km in the Lower Dachigam area of Dachigam NP during high fruit abundance of 1988-1989. Bear encounter rates along transects for the same period ranged from 0 to 3.5 bears/km and 25 to 40 bears were estimated to use Lower Dachigam from late June through October (particularly in early September).

Himachal Pradesh: The Asiatic Black Bear is present in and around 21 PAs (Sathyakumar 2001). Outside PAs, Asiatic Black Bear is reported to occur in an additional 25 areas, including the forested areas of Pangri (Chenab Catchment) and Bharmaur valleys (Ravi catchment) in Chamba district; Dhaula Dhar Range (Beas Catchment), Bara Bangal, Chota Bangal and Bir in Kangra district; Parbati Valley, Pandrabis, Bashleo Pass (Sutlej Catchment), Solang and Jagatsukh valleys in Kullu district; the upper catchments of Bata and Giri in Solan and Shimla districts; the catchments of the Sutlej and Yamuna, Shimla ridge, Karsog, Shali, Kandyali, Hatu and Moral Kanda areas in Shimla district; and the Ropa valley, and Kalpa and Kaksthal areas in Kinnaur

Table 2a: Asiatic Black Bear populations and their past and present relative abundance in Protected Areas (Jammu & Kashmir, Himachal Pradesh) based on questionnaire responses, recent surveys and interviews (modified from Sathyakumar 2001)

State, Protected Area (area in sq. km)	Relative abundance	
	1990s	2005
Jammu and Kashmir		
Ajas CR (48)	Fairly common (?)	Fairly common
Bran-Harwan CR (19)	Fairly common (?)	Fairly common
City Forest (Sálim Ali) NP (10)	Fairly common (?)	Fairly common
Dachigam NP (171)	Very common (?)	Common
Gulmarg WS (139)	Fairly common (?)	Fairly common
Hirapora WS (115)	Fairly common (?)	Rare
Khiram-Shikargarh-Panyar-Khangund CR (118)	Fairly common (?)	Fairly common
Khrew-Khonmoh CR (117)	Fairly common (?)	Fairly common
Kistwar NP (400)	Unknown (1995)	Fairly common
Lachipora WS (96)	Fairly common (?)	Fairly common
Limber WS (44)	Fairly common (?)	Fairly common
Naganari CR (22)	Fairly common (?)	Fairly common
Overa-Aru WS (511)	Fairly common (?) (1991)	Fairly common
Rajparian (Daksum) WS (49)	Common (?)	Fairly common
Thajwas (Batal) WS (211)	Fairly common (?)	Rare
Wangat CR (59)	Fairly common (?)	Common
Himachal Pradesh		
Bandli WS (41)	Unknown (1995)	Rare
Chail WS (109)	Unknown (1995)	Fairly common
Churdar WS (66)	Unknown (1995)	Unknown
Daranghati WS (167)	Fairly common (1994)	Unknown
Gangul Siahbehi WS (109)	Unknown (1994)	Fairly common
Great Himalayan NP (755)	Fairly common (1994)	Fairly common
Kias WS (14)	Fairly common (1994)	Fairly common
Kalatop-Khajjjar WS (69)	Fairly common (1994)	Fairly common
Kanawar WS (61)	Fairly common (1994)	Common
Khokhan WS (14)	Unknown (1995)	Common
Kugti WS (379)	Fairly common (1993)	Fairly common
Lippa Asrang WS (349)	Common (1993)	Unknown
Majhatal WS (58)	Unknown (1995)	Fairly common
Manali WS (32)	Rare (1991)	Rare
Nargu WS (278)	Unknown (1995)	Fairly common
Rupi Bhaba WS (738)	Common (1994)	Fairly common
Sangla (R/Chitkul) WS (650)	Very common (1994)	Unknown
Sechu Tuan Nala WS (103)	Unknown (1995)	Unknown
Shikari Devi WS (72)	Rare (1994)	Fairly common
Talra WS (40)	Unknown (1995)	Unknown
Tundah WS (64)	Very common (1993)	Unknown

WS - wildlife sanctuary; NP - national park; CR - conservation reserve; ? - year unknown

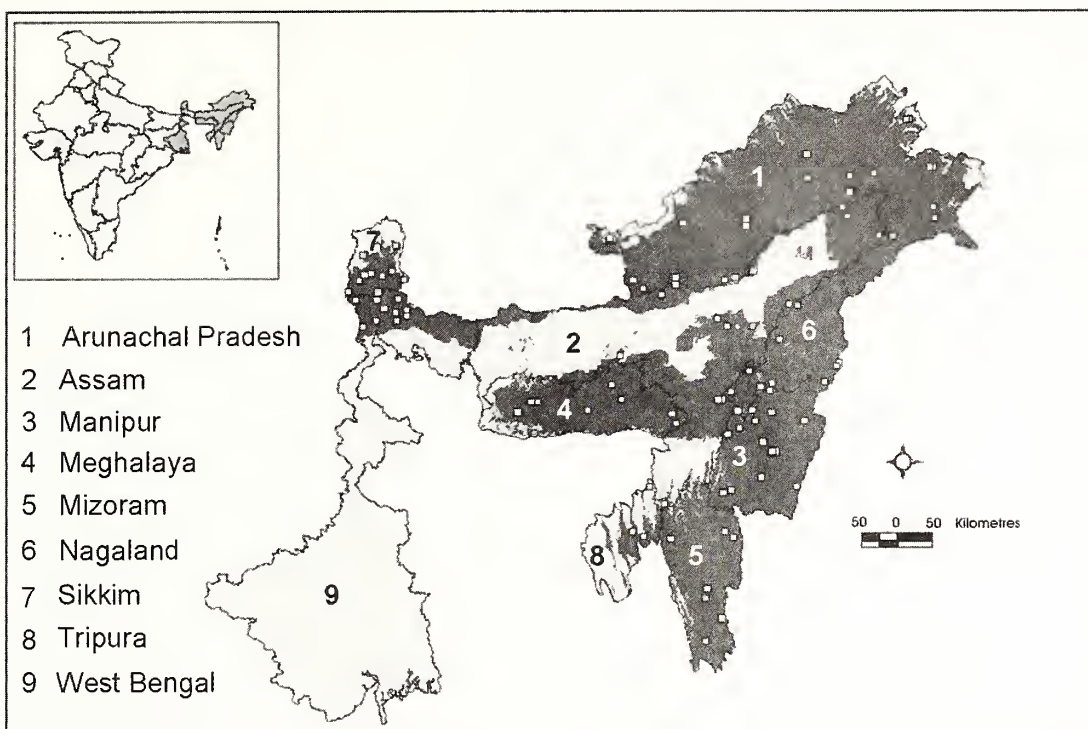


Fig. 2: Asiatic Black Bear Distribution in north-eastern India (states of West Bengal, Sikkim, Arunachal Pradesh, Assam, Meghalaya, Mizoram, Manipur, Nagaland and Tripura); Squares denote protected areas

district (Sathyakumar 2001).

Vinod and Sathyakumar (1999) reported that Asiatic Black Bear encounter rates along transects ranged from 0.01 to 0.02 bears/km in the Great Himalayan NP between 1996 and 1999. Survey respondents reported bear-human conflicts to be high around the PAs. Chauhan (2003) on the basis of an assessment of wildlife-human conflicts at the Great Himalayan NP during the period 1989-1998 has reported that 26% of livestock depredation was by Black and Brown bears and this occurred primarily in alpine rangelands (58%) where livestock grazing is generally unsupervised, with depredation occurring largely during September (41%).

Uttarakhand: The Asiatic Black Bear is present in and around 10 PAs (Table 2b): Bears are reported in 15 areas outside PAs, including the FDs of Tons, Uttarkashi, Tehri, Badrinath, Pithoragarh, Narendra Nagar, Chakrata, Ram Nagar, Almora, Bageshwar, Nainital, and Kedarnath Wildlife Division. Bears have also been reported in the Yamunotri and Gangotri valleys, the upper catchment of the Ram Ganga, Ladhiya Valley and some parts of the Terai FD (Sathyakumar 2001).

Recent surveys have revealed that the status of the Asiatic Black Bear has improved during a 10 year period in Nanda Devi NP from no sightings or evidence in 1993 to one sighting and four scats in 2003 (Sathyakumar 2004). Asiatic Black Bear encounter rates along transects in this NP ranged

from 0 to 0.66 scats/km during 2003. In the Valley of Flowers NP and the buffer zones of Nanda Devi BR, 28 individuals (including five females with cubs), were sighted during a one month survey period (November-December 2005) and encounter rates along transects ranged from 0 to 0.4 bear scats/km (G. Pandey, Nanda Devi BR, Uttarakhand, India, pers. comm. in 2006). In Rajaji NP, the Asiatic Black Bear range overlapped with that of the Sloth Bear; the Asiatic Black Bear was reported to be 'rare' (Table 2b). In Rajaji NP, Asiatic Black Bear were photographed at remote camera traps on 10 occasions out of 900 trap nights (B. Pandav, Wildlife Institute of India, Dehradun, India, pers. comm. in 2006).

West Bengal: Survey respondents reported that Asiatic Black Bear occur in and around four PAs in the northern part of West Bengal (Table 2b) and in the forested areas of Darjeeling, Kalimpong Hills, Kolbang, Rehit and Pankasari RFs (V.K. Sood and Tapan Das, State Forest Department, pers. comm. in 2005). The status of the Asiatic Black Bear in Senchal WS is unknown, but it has been reported to occur in this PA.

Sikkim: The Asiatic Black Bear is reported to be 'fairly common' in Kanchendzonga NP (Gut Lepcha, Department of Forests, Environment and Wildlife Management, Government of Sikkim, pers. comm. in 2005). Sathyakumar (2001) has reported that bears occur in suitable undisturbed forested areas at elevations between 1,200 and 3,000 m in Sikkim (Table 2b).

Table 2b: Asiatic Black Bear populations and their past and present relative abundance in protected areas (PAs: Uttarakhand, West Bengal, Sikkim, Arunachal Pradesh, Assam) based on questionnaire responses, recent surveys and interviews (modified from Sathyakumar 2001).

State, Protected Area (area in sq. km)	Relative abundance	
	1990s	2005
Uttarakhand		
Askot WS (600)	Rare (1994)	Fairly common
Corbett NP (521) & TR	Rare (1993)	Rare
Govind NP & WS (953)	Rare (1992)	Common
Kedarnath WS (975)	Fairly common (1994)	Common
Mussorie WS (11)	Very common (?)	Common
Nanda Devi NP (625)	Rare (1993)	Fairly common
Nanda Devi BR (5,150)	Fairly common (1993)	Fairly common
Rajaji NP (820)	Unknown	Rare
Valley of Flowers NP (88)	Fairly common (1995)	Fairly common
West Bengal		
Buxa TR (759)	Rare (1999)	Rare
Mahananda WS (158)	Unknown (1995)	Rare
Neora NP (88)	Common (1999)	Fairly common
Singalila NP (79)	Rare (1999)	Fairly common
Sikkim		
Fambong Lho WS (52)	Unknown (1995)	Rare
Kanchendzonga NP (1,784)	Common (1999)	Fairly common
Pangolakha NP (128)	Common (1999)	Rare
Arunachal Pradesh		
Dibang WS (4,149)	Common (1999)	Fairly common
Eagle's Nest WS (217)	Common (1999)	Fairly common
Itanagar WS (140)	Fairly common (1995)	Fairly common
Kamlang WS (783)	Fairly common (1994)	Fairly common
Kane WS (55)	Rare (1991)	Rare
Mehao WS (282)	Common (1999)	Fairly common
Mouling NP (483)	Common (1999)	Fairly common
Namdapha NP and TR (4,985)	Rare (1996)	Fairly common
Pakke WS (862)	Common (1999)	Fairly common
Sessa Orchid Sanctuary (100)	Common (1999)	Fairly common
Taley Valley WS (425)	Unknown (1994)	Fairly common
Assam		
Barail WS (326)	Fairly common (1996)	Fairly common
East Karbi Anglong WS (222)	Fairly common (1996)	Fairly common
Marat Longri WS (451)	Rare (1992)	Very rare
Manas NP (500)	Rare (1995)	Very rare
Nameri NP (200)	Rare (1998)	Very rare
North Karbi Anglong WS (96)	Rare (1999)	Rare
Sonai-Rupai WS (220)	Rare (1998)	Very Rare

WS - wildlife sanctuary; NP - national park; TR - tiger reserve; BR - biosphere reserve; ? - year unknown

Assam: The Asiatic Black Bear occurs throughout the hills of Assam and has been reported to occur in the plains (Choudhury 1997a). Assam is not indicated in the 1994-1995 survey (Sathyakumar 2001) as it was believed that this state did not hold any Asiatic Black Bears, although a few individuals were thought to inhabit areas along the border with Arunachal Pradesh. During the 2005 survey, we obtained information on the presence of the Asiatic Black Bear in seven PAs (Table 2). The Asiatic Black Bear is also fairly common in the forested areas of Karbi Anglong district (Choudhury 1992) and North Cachar Hills district (Table 2b).

Arunachal Pradesh: With more than 80% of its geographical area under forest cover, Arunachal Pradesh has a nearly continuous distribution of the Asiatic Black Bear, but there are serious threats from poaching. It is reported to be 'fairly common', occurring in suitable undisturbed habitats throughout Arunachal Pradesh (Sathyakumar 2001). It is reported to occur in 11 PAs in this state (Choudhury 2003) (Table 2b). The Asiatic Black Bear has also been reported to occur in other areas, such as Hot Spring, Ditchu (Lohit district), Taley Valley RF, Anini Social FD and Siang district. A survey of wild animal use by humans revealed that in two villages of Lower Dibang Valley district, at least 52 bears were killed in a single year (Choudhury and Rengma *unpubl.*).

Mizoram and Meghalaya: The Asiatic Black Bear distribution extends into Mizoram and Meghalaya where it is reported to occur in five and three PAs respectively. However, survey respondents reported the species as 'rare' in these areas (N.R. Pradhan, State Forest Department, pers. comm. in 2005). In Meghalaya, the Asiatic Black Bear is present in and around Balphakram NP, Nokrek BR and Nongkhylllem WS (Sathyakumar 2001). It is reported as 'rare' in the Garo, Khasi, and Jaintia hills, Saipung RF and Narpuh RF (S. Kumar, State Forest Department, pers. comm. in 2005) (Table 2c).

Tripura, Manipur and Nagaland: The hill ranges in Tripura contain small scattered populations. The Asiatic Black Bear is reported in Trishna WS (S. Dasgupta, Wildlife Institute of India, pers. comm. in 2004) Kailashahar FD, Manu, Kanchanpur FD, Longthorai RF, and Deo RF, although the status is unknown. Manipur, Mizoram, Nagaland and Arunachal Pradesh are the only four states in India where the distribution ranges of the Asiatic Black Bear and Sun Bear overlap. In Manipur, the Asiatic Black Bear is found throughout the hilly areas (Gee 1967; Choudhury 1992). Bears are reported to occur in Kailam WS (Table 2c) and Kangpokpi-Tamenglong Protected Forest (Thambou Kamei, State Forest Department, pers. comm. in 2005). In Nagaland, the Asiatic Black Bear is reported as 'fairly common' in Fakim WS (Ramesh Aima, State Forest Department, pers. comm. in

2005), but is well distributed across the state. A survey of patterns of animal use by humans revealed that large numbers of Asiatic Black Bears are killed every year. A small sample ($n=15$) of Phesama village had indulged in harvesting of at least 52 bears in their lifetime (Choudhury and Rengma *unpubl.*).

Habitat and population estimates

Based on the 2005 survey, we developed a distribution range map for the Asiatic Black Bear in India using a rule-based model in the GIS based on the forest cover, altitude range limits of the species and recent information on the presence/absence of this species in India (Figs 1 and 2). Based on a literature survey, the survey results and expert knowledge, we considered the altitude limits of the Asiatic Black Bear distribution range as 1,200 m and the tree line (3,300 m) in northern India and as 70 m and the tree line (4,300 m) in north-eastern India. Availability of forest cover was the other parameter that was used in the model. The Asiatic Black Bear is known to use relatively productive habitats that are man-made such as croplands and orchards that are interspersed with or that lie adjacent to forested habitats (Sathyakumar 2001; Johnsingh 2003). Using this model, we now estimate

Table 2c: Asiatic Black Bear populations and their past and present relative abundance in protected areas (PAs: Meghalaya, Mizoram, Tripura, Manipur, Nagaland) based on questionnaire responses, recent surveys and interviews (modified from Sathyakumar 2001).

State, Protected Area (area in sq. km)	Relative abundance	
	1990s	2005
Meghalaya		
Balphakram NP (220)	Unknown (1995)	Very rare
Nokrek NP and BR (80)	Unknown (1995)	Occasional
Nongkhylllem WS (29)	Rare (?)	Occasional
Mizoram		
Dampa WS (500)	Unknown (1995)	Rare
Lengteng WS (60)	Unknown (1995)	Rare
Murlen NP (100)	Unknown (1995)	Rare
Ngengpui WS (110)	Common (1999)	Rare
Phawngpui NP (50)	Common (1999)	Rare
Tripura		
Trishna WS (195)	Unknown (1995)	???
Manipur		
Kailam WS (188)	Unknown (1995)	Very rare
Nagaland		
Fakim WS (6)	Unknown (1995)	Fairly common

WS - wildlife sanctuary; NP - national park; BR - biosphere reserve; ? - year unknown

the potential Asiatic Black Bear distribution range to be 269,350 sq. km (71,445 sq. km in the Western Himalayan region and 191,445 sq. km in the Eastern Himalayan region and Northeast Hills) or about 270,000 sq. km. Density estimates for the Asiatic Black Bear in India varies between 10 bears/100 sq. km (Dachigam NP) to 6 bears/100 sq. km (some areas in Arunachal Pradesh) and 2 to 3 bears/100 sq. km (most of the distribution range). Based on these density estimates, we used densities of 1 bear /40 sq. km and 1/50 sq. km to extrapolate an estimated Asiatic Black Bear population in India of *c.* 5,400 to 6,750 animals. This estimate appears to be more realistic considering the present Asiatic Black Bear distribution and potential habitat range available in India, compared to the earlier estimate of a minimum of 3000 bears made by Johnsingh (2003).

DISCUSSION

Limitations of the questionnaire survey

After the 2005 survey, substantial information has been added to the existing knowledge on the distribution of the Asiatic Black Bear in India. This only indicates an increase in the awareness on the importance of reporting the presence/absence of the Asiatic Black Bear in an area, and does not mean that the distribution range of this species has increased in India. Asiatic Black Bear populations are declining in many areas due to poaching for illegal trade in bear parts and habitat loss/degradation. However, there is no quantitative information available to indicate negative changes in the population trend of the Asiatic Black Bear in India as no regular monitoring exercise is in practice. The qualitative assessment of the relative abundance of the Asiatic Black Bears in a PAs is made by the PA manager based on the bear sightings and bear sign encounters that he/she has recorded and/or based on the sightings / bear sign encounters that were recorded by the field staff. This may be inconsistent due to varying levels of effort made and observer efficiency, and therefore may not be a reliable indication of the actual status.

Prior to the 1994-1995 survey, there was no information on the relative abundance of the Asiatic Black Bear in PAs (Sathyakumar 2001). After the 2005 survey, an assessment of the changes in the relative abundance of bears in PAs between the 1995 and 2005 surveys was made. It appears that there has been a marginal improvement in the status (qualitative relative abundance) of the Asiatic Black Bear in 24 PAs, no change in status in 30 PAs and a declining status in 28 PAs. However, as mentioned above, such an interpretation would be incorrect due to the inconsistency in the reporting due to varying levels of effort made to record bear sightings and/or bear signs by observers with varying

efficiency levels. It would be ideal to have regular bear sign surveys along transects/trails in different parts of a PA during different seasons so that we can obtain estimates of bear encounter rates along with the variance. Such estimates would be of great help in monitoring changes in the Asiatic Black Bear status or population in an area.

Human-Bear Interactions

Conflicts with humans: One of the most serious limiting factors for Asiatic Black Bear conservation in India is the response of people to human-Asiatic Black Bear conflict. Reports to the Forest and Wildlife Department of Asiatic Black Bears killing livestock and attacking humans are common, largely in the north-western and western Himalayan region. For example, in Uttarakhand, Asiatic Black Bears accounted for 28.5% of 540 attacks on humans by large carnivores between 1991 and 2001. Of these attacks, 9% resulted in human fatalities (Chauhan *unpubl.*). In the Great Himalayan NP, 350 of 1,348 (26%) incidents of livestock predation during 1989-1998 involved Black or Brown bears (Chauhan 2003). In Arunachal Pradesh, Asiatic Black Bears cause damage to maize, which is a major crop for many hill tribe people. Possible causes for the increased incidences in the reporting of livestock depredation and attacks on humans by Asiatic Black Bears are (1) shrinking habitat due to extension of agricultural lands, other human encroachment, and habitat degradation, which have led to increased use of agricultural lands by bears; (2) increasing human and livestock populations in and around PAs and forested areas, and increased dependence on forests by humans leading to increased frequencies of bear-human encounters; (3) unsupervised livestock grazing; and (4) increased awareness among local people regarding compensation paid by the government for damage caused by wildlife, leading to an increase in the proportion of incidents reported. As a result of the above, any increase in Asiatic Black Bear population in an area in the recent past is very unlikely with the exception of a very few undisturbed areas (Sathyakumar 2001).

Poaching threats: Asiatic Black Bear populations in India are largely threatened due to poaching for the gall bladder and skin. Although the former is believed to be of medicinal value, the latter is used for trophy or ornamental purposes. Many Chinese medical texts recommend the Asiatic Black Bear as the source for medicinal bile. Although bears are protected in India, it is difficult to prosecute in poaching cases because of lack of *prima facie* evidence in the courts. Poaching and the illegal trade across international borders is thought to be widespread. India has long boundaries with Pakistan, China, Nepal, Bhutan and Myanmar, often in remote, rugged mountainous terrain, making it difficult to

police the borders and control the cross-border trade. According to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), between 1975 and 1993 about 1,307 kg of bear gall bladder was sold in international markets along with 11,667 kg, 44,219 units, 750 cartons and 500 boxes of bear derivatives (Mills *et al.* 1995). For the same period, about 4,136 kg of gall bladder is also reported from the Republic of Korea, which would mean another 68,933 bears (at 60 grams of bile/bear) killed for the trade. The retail price of bear gall bladder in California in the USA is about US \$1,200-2,000/gm and it is up to US \$500 /gm in South Korea (Mills *et al.* 1995).

The growing demand for bear products in Asia has led to serious impacts on bear populations in India. In Arunachal Pradesh and other north-eastern states, indigenous people hunt the Asiatic Black Bear for its skin and meat. For example, the 'Nishi' (earlier known as Daffla) people wear bear skins on the back of their neck and use them in making 'dao' (knife) holders. All huts of indigenous people have a display of wild animal skulls and skins, many including parts from Asiatic Black Bears.

Habitat degradation: Based on the 2005 estimate, the potential Asiatic Black Bear distribution range in India is estimated to be about 270,000 sq. km which is almost identical to the estimate made by Johnsingh (2003). Of this total potential Asiatic Black Bear habitat range in India, less than 10% is protected under the existing network of PAs. Throughout India, there are major threats to Asiatic Black Bear habitats. Habitat degradation is largely due to development projects and human dependence on forests for fuel wood and fodder (many of them bear food plants), as well as the extraction of other forest products such as montane bamboo (*Arundinaria falcata*, *Chimnobambusa jaunsarensis*, *Thamnocalamus falconeri*, *T. spathiflorus*). In Arunachal Pradesh and Sikkim, habitat loss is mainly due to development activities. In the north-eastern states, *jhum* (shifting cultivation) has led to serious impacts on Asiatic Black Bear habitat. In Meghalaya, about 95% of the land is privately owned and the state government has difficulties in protecting wildlife or habitats in these areas (Sathyakumar 2001). Over 70% of the PAs with Asiatic Black Bear populations have an extent of less than 500 sq. km and suffer from anthropogenic pressures from within and outside. Identifying forested areas adjacent to PAs and forest corridors between PAs is crucial.

Conservation Recommendations

The recently amended Indian Wildlife (Protection) Act of 1972 (GoI 2003) offers options for creation of new categories of PAs such as CRs and Community Reserves and CMRs. Crucial Asiatic Black Bear populations that occur outside the PA network, but form corridors to existing population units,

could be protected through creation of CRs and CMRs and by community participation. The Jammu and Kashmir Government has recently created ten CRs. Such efforts have to be taken up in other states, particularly in north-east India.

To control poaching and smuggling, additional well-trained wildlife staff are needed. Adequate facilities, incentives, remote area allowances, equipment and motivation are required for wildlife staff in all areas. Wildlife awareness programmes for the Indian Army, border police personnel and the general public are needed. The Government should regulate all development activities, such as dam and road construction in Asiatic Black Bear and other wildlife habitats by ensuring completion of environmental impact assessment studies prior to project approval. Additionally, the short cycle of *jhum* (shifting cultivation) in north-eastern states needs to be replaced with longer cycles (Sathyakumar 2001).

Status surveys should be conducted for the Asiatic Black Bear in most parts of Sikkim, northern West Bengal, Arunachal Pradesh and other north-eastern hill states. Regular monitoring of Asiatic Black Bear populations based on direct and indirect evidences should be carried out in PAs. Simple indices of relative abundance, such as encounter rates based on direct (sightings) and indirect evidence (bear tracks, scats, rubbing signs, rake marks on trees, feeding signs and other) could be obtained by sampling trails or transects in different parts of a PA or RF regularly in different seasons. Scientific

research on the ecology of Asiatic Black Bear is necessary because information on food and feeding habits, habitat utilisation, bear-human conflicts and ranging patterns is crucial for reducing conflicts and for the long-term conservation and management of this species in India. An assessment of the illegal trade in bear parts is also extremely important to understand the extent and magnitude of impacts on the wild bear populations in India.

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